

Total Intravenous Anaesthesia

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<https://doi.org/10.5281/zenodo.8360822>

While mentioning anything regarding intravenous route it is important to mention the contributions of Francis Rynd (hollow needle in 1845) and Charles Gabriel Parvaz (syringe in 1853), that has made intravenous administration of drugs so feasible and effective.

Now a days when the field of medical science is widely progressing in all the aspects, the techniques and concepts for the use of anaesthetic agents has also evolved in order to improve the depth of surgical plane of anaesthesia and post operative recovery of the patient. One of such evolved techniques is Total Intravenous Anaesthesia. Where solely injectable anaesthetics are used to induce and maintain the anaesthetic planes. Prior to this technique the most routinely practiced protocol was Combined anaesthetic Protocol, where the combination of Injectable and gaseous anaesthetics was used for induction and maintenance.

TIVA is the popular abbreviation used for Total Intravenous anaesthesia. TIVA helps to attain general anaesthesia and hence prevents the side effects that are caused by the certain volatile inhalant anaesthetic agents (Murray et al. 2009). In this technique the intravenous agents are titrated considering the safety doses for the maintenance of surgical plane of anaesthesia. Broadly considering, the combination of any hypnotics and opioids can be used for Total Intravenous anaesthesia. Sedative-hypnotic agents like Ketamine, Propofol and Etomidate are widely used as TIVA in human medical practice (Hendrickx et al. 2008)

Objectives:

- Smooth induction depending upon the amount of titrated anaesthetic agents.
- Rapid recovery by the end of titration of anaesthetic agents.
- Effective and easy monitoring of anaesthesia.



Specific indications for TIVA

- Anaesthesia in non-theatre environments
- Malignant hyperthermia risk
- History of severe PONV
- Patients with anticipated difficult intubation/extubation
- Surgery requiring neurophysiological monitoring
- Transfer of an anaesthetised patient between environments

Equipments and Maintenance

The delivery of intravenous anaesthetics is dependent on different types of infusion devices. Examples of infusion devices include smart pumps, syringe pumps and target controlled infusion (TCI) devices.

During TIVA, the continuous assessment of heart rate, blood pressure, and state of consciousness is essential when titrating anaesthetic agents. (Bowdle et al., 2021; Nimmo et al., 2018) Processed electroencephalogram (EEG) monitoring is used to assess anaesthetic depth.

Ideal properties of TIVA

- Should be water soluble,
- Should be stable in solution and chemically compatible with other drugs.
- Should be Non- tissue toxic (in case of peri-vascular injection),
- Can be given in concentrated form,
- Not absorbed by plastics (tubing etc.),
- Should not promote bacterial growth,
- Rapid onset of action and clearance from the body for rapid predictable recovery,
- Should have Fewer adverse/side effects and should be cheaper.

Conclusion

TIVA can be considered as one of the safest, cheapest and more convenient anaesthetic techniques. TIVA is the default solution for a patient with malignant hyperthermia risk who requires general anaesthesia. It is the finest alternative currently available for administering anaesthesia to field veterinarians since it can be utilised in field situations.

References

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